Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KAREN I. TROVATO
and
LEENDERT DORST

Appeal No. 1998-1734
Application No. 07/508,024

ON BRIEF

Before KRASS, HECKER, and BARRY, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1, 30 and 41-53, all of the claims pending in the application.

The invention is directed to a method and apparatus for planning a path with regard to moving objects. The invention is embodied in software for creating, in a computer memory, an internal representation of the path and then sending signals to the object relative to updated configurations of the path so that

the object can be moved accordingly. In particular, when conditions in the physical task space of the object change, the internal representation or configuration of the path is changed. However, rather than recalculating the entire configuration space, only the values associated with those states that are actually affected need to be redetermined using a "budding" process.

This case, along with a related case, Application Serial No. 07/617,303, has had a long and torturous prosecution history. Instant claims 1, 30 and 41-45 have been previously appealed to this Board and a decision was rendered in that case on July 22, 1992, wherein the examiner's decision rejecting the claims as being directed to nonstatutory subject matter under 35 U.S.C. § 101 was affirmed. On appeal to the Court of Appeals for the Federal Circuit (Federal Circuit), our reviewing court affirmed the decision of the Board in this case, as well as in the companion case, on December 19, 1994 (In re Trovato, 42 F.3d 1376, 33 USPQ2d 1194 (Fed. Cir. 1994). Then, in a decision of July 25, 1995, the Federal Circuit vacated its original decision of December 19, 1994, and remanded this application for reconsideration in view of the new guidelines adopted by the U.S. Patent and Trademark Office for examination of computer-related

inventions. On remand and reconsideration, the examiner again rejected the claimed subject matter under 35 U.S.C. § 101 as being directed to nonstatutory subject matter, as well as claims 46-53 under 35 U.S.C. § 112, second paragraph. This appeal followed.

Representative independent claim 1 is reproduced as follows:

> 1. A method for planning a physical path for a physical object to follow in a physical task space in which there has been a physical change in conditions comprising executing the following steps in at least one digital data processing device that includes or is coupled with at least one computer readable medium:
>
> a. starting from an initialized configuration space data structure, embodied within the at least one computer storage medium and representing the physical task space, the configuration space data structure storing signals representing the object and its environment;
>
> b. receiving signals indicating the physical change in conditions;
>
> c. identifying a perimeter of a region in the configuration space data structure which is affected by the change in conditions;
>
> d. propagating cost waves in the configuration space data structure, within the at least one computer readable medium, from the perimeter to update the signals stored in the configuration space data structure; and
>
> e. providing parameter signals based on the updated signals, the parameter signals being usable by the physical object to follow the physical path.

No references are relied upon.

Claims 46-53 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The examiner contends that the claimed function of "maintaining a configuration space data structure" is indefinite because the meaning of "maintaining" is unclear. Further, he contends that the claimed function of "receiving signals" is unclear because "it is not understood how such an encoded computer program could perform the function of ' . . . receiving signals . . . '" (answer-page 4).

Claims 1, 30 and 41-53 stand rejected under 35 U.S.C. § 101 as being directed to nonstatutory subject matter. The examiner contends that the claimed invention is directed to a mathematical algorithm with insignificant pre- and post-solution activity. Reference is made to pages 4-12 of the answer for the examiner's complete explanation of the rejection.

Reference is made to the briefs and answer for the respective positions of appellants and the examiner.

OPINION

Turning first to the rejection of claims 46-53 under 35 U.S.C. § 112, second paragraph, we will not sustain this rejection.

We are sympathetic to the examiner's position because it does appear a bit awkward to recite that a computer readable storage medium that has been encoded with a computer program comprises a "means for maintaining . . . " and a "means for receiving signals . . . . " Clearly, such a "medium," e.g., a disk, comprises no such physical means. However, when read in light of the disclosure, with the knowledge that the invention deals with software embodied on the computer readable medium, it becomes clear to the artisan that such "means" are embodied in the encoded computer program resident on the medium in the sense that the instructions therein cause actions within the computer. That is, the instructions embodied in the program which is encoded on the medium cause a computer memory to be configured in a particular manner in accordance with a "data structure" which is "maintained" within the program. As the configuration changes due to changes in conditions, that "data structure" is changed, in accordance with the program, so that the computer memory is updated to reflect such changes. Similarly, while leads attached to the computer are the physical embodiment of what receives signals, the instructions forming the computer program which is embodied on the computer readable storage medium allow for the signals indicating the change in conditions to be received.

Perhaps it would have been more accurate, in claim 46, to recite that the computer readable storage medium encoded with a computer program comprises means for "causing" or "allowing" a configuration space data structure to be maintained and signals indicating the change in conditions to be received. However, since the artisan would be able to ascertain what is meant from the disclosure, together with the artisan's own knowledge, we will not sustain the rejection of claims 46-53 under 35 U.S.C. § 112, second paragraph.

We now turn to the rejection of all the claims under 35 U.S.C. § 101.

The previous Board decision, as well as the vacated Federal Circuit's decision, was based on large part, on an analysis of the claimed subject matter using the "Freeman-Walter-Abele" test.[1] Under the first part of that test for statutory subject matter, claims are analyzed to determine whether a mathematical algorithm is either directly or indirectly recited. Under the second step of the two-part test, if the claims directly or indirectly recite

[1]See In re Freeman, 573 F.2d 1237, 197 USPQ 464 (CCPA 1978); In re Walter, 618 F.2d 758, 205 USPQ 397 (CCPA 1980); In re Abele, 684 F.2d 902, 214 USPQ 682 (CCPA 1982).

a mathematical algorithm, a determination is made as to whether or not the claims, as a whole, merely recite the mathematical algorithm.

Between the time of these previous decisions and the present time, the Federal Circuit has issued its decision in State Street Bank & Trust Co. v. Signature Financial Group, Inc., 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998). In our view, State Street is controlling in the instant case. In accordance with State Street, the applicability of the "Freeman-Walter-Abele" test "could be misleading, because a process, machine, manufacture, or composition of matter employing a law of nature, natural phenomenon, or abstract idea is patentable subject matter even though a law of nature, natural phenomenon, or abstract idea would not, by itself, be entitled to such protection." State Street, 149 F.3d at 1374, 47 USPQ2d at 1601. That is, "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program or digital computer." Diamond v. Diehr, 450 U.S. 175, 187, 209 USPQ 1, 8 (1981).

Finally, it is apparent that the Federal Circuit in State Street favored a more pragmatic approach of determining whether the claimed subject matter "constitutes a practical application

of a mathematical algorithm, formula, or calculation." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601. The court indicated therein that the focus of a statutory subject analysis should be "on the essential characteristics of the subject matter, in particular, its practical utility." State Street, 149 F.3d at 1375, 47 USPQ2d at 1602. These principles appear to have been reinforced in AT&T Corp v. Excel Communications, Inc., 172 F.3d 1352, 1356, 50 USPQ2d 1447, 1450 (Fed. Cir. 1999).

Applying these principles to the instant claimed subject matter, we find that the instant claims are directed to practical applications of computer-implemented methods and apparatus for planning a physical path for a physical object to follow in a physical task space. While mathematical algorithms may be involved in the processing data to update a configuration space data structure, the "essential characteristic" of the subject matter, or its "practical utility," is to plan a physical path for an object to follow in a physical task space by reacting to condition changes and updating signals stored in the configuration space data structure in order to provide parameter signals for the object to use to follow the physical path. This is clear from the language of independent method claims 1 and 30.

Independent apparatus claims 41 and 43 are in means-plus-function format and it is clear from the disclosure that these "means" refer to the software embodiment disclosed. The computer program provides for the claimed functions and, like the method claims, claims 41 and 43 are directed to a practical application of any mathematical algorithms recited. That is, the claims are directed to the planning of a path for an object to follow in a physical task space and for updating a configuration space based on changed conditions so that updated signals can be used by the object to follow the path. While it is true that the claims do not actually require use of the resultant parameter signals by the object since they stop short at the production of those signals and recite only an intended use, i.e., the parameter signals "being usable" by the object, the updated parameter signals produced are, themselves, of practical utility, in controlling the movement of an object in a path.

Turning to independent claim 46, this claim is directed to a "computer readable storage medium encoded with a computer program . . . . " On its face, the claim is directed to statutory subject matter, i.e., a "computer readable storage medium" is, at least, an article of manufacture. The fact that it comprises thereon an encoded computer program does not now take this

physical article of manufacture out of the statutory realm. Moreover, like the claims previously discussed, this claim is also directed to a practical application of a computer program. That application is the planning of a path for an object to follow in a physical task space and updating a configuration space data structure to reflect changed conditions in order to provide a parameter signal which is usable by the object to follow the path.

Accordingly, we will not sustain the examiner's rejection of claims 1, 30 and 41-53 under 35 U.S.C. § 101 since it is our view that the instant claims are directed to statutory subject matter.

Since we have not sustained either the rejection of claims 46-53 under 35 U.S.C. § 112, second paragraph, or the rejection of claims 1, 30 and 41-53 under 35 U.S.C. § 101, the examiner's decision is reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)	
STUART N. HECKER Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)	

EAK:hh

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